



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION of
Inventor(s):

Appln. No. 10/530545

Group Art:

Filed:

Examiner:

Title:

VERIFIED TRANSLATION OF PRIORITY DOCUMENT

The undersigned, of the below address, hereby certifies that he/she well knows both the English and Japanese languages, and that the attached is an accurate translation into the English language of the Certified Copy, filed for this application under 35 U.S.C. Section 119 and/or 365, of:

Application No.

Country

Date Filed

2002-334797

Japan

November 19, 2002

Signed this 23rd day of March, 2006.

Signature: Akira Kamiya

Name: Akira Kamiya

Address: 14 kubomi-cho, Gifu-city,

Gifu-pref., 500-8349, JAPAN

[Name of Document]	Patent Application	
[Reference Number]	PY20022003	
[Filing Date]	November 19, 2002	
[Address]	Commissioner, Patent Office	
[International Patent Classification]	H02K 5/22	
[Inventor]		
[Address]	c/o ASMO Co.,Ltd. 390 Umeda, Kosai-city, Shizuoka-pref.	
[Name]	Nobuo Mizutani	
[Applicant]		
[Identification Number]	000101352	
[Name]	ASMO Co.,Ltd.	
[Agent]		
[Identification Number]	100068755	
[Patent Attorney]		
[Name]	Hironobu Onda	
[Assigned Agent]		
[Identification Number]	100105957	
[Patent Attorney]		
[Name]	Makoto Onda	
[Indication of Fees]		
[Prepayment Book Number]	002956	
[Amount of Payment]	¥21,000	
[List of Submitted Articles]		
[Name of Article]	Specification	1
[Name of Article]	Drawings	1
[Name of Article]	Abstract	1
[General Power of Attorney Number]	9804529	
[Need of Proof]	Needed	

[Name of Document] Specification

[Title of Invention] Motor

[Claims]

[Claim 1]

5 A motor comprising:

 a yoke housing that rotatably houses an armature, wherein
the armature has a rotatable shaft and a commutator;

 a gear housing that is integrally assembled to the yoke
housing and houses a speed reducing mechanism for decelerating
10 rotation of the rotatable shaft;

 a brush holder that holds brushes in slidable contact with
the commutator; and

 a connector portion for supplying the brushes with power
from an external source, the motor being characterized in that:

15 the brush holder has a holder-side connecting portion;

 the connector portion has a connector-side connecting
portion for electrical and mechanical connection with the
holder-side connecting portion; and

 both the connecting portions are brought into connected
20 state and clamped between the yoke housing and the gear housing.

[Claim 2]

 The motor according to claim 1, characterized in that:

 the yoke housing and the gear housing are assembled
together in a direction of an axis of the rotatable shaft, and

25 the holder-side connecting portion of the brush holder and
the connector-side connecting portion of the connector portion
are connected with each other in a direction, which coincides with

a direction of assembly of both the housings.

[Claim 3]

The motor according to claim 1 or 2, characterized in that the connector portion has a restraining portion for restraining movement in a direction, which is orthogonal to the rotatable shaft.

[Claim 4]

The motor according to any one of claims 1 to 3, further characterized by a plurality of fixing portions, which fix the yoke housing to the gear housing, wherein both the connecting portions are positioned between at least two of the fixing portions.

[Claim 5]

The motor according to any one of claims 1 to 4, characterized in that:

the brush holder has holder-side connecting terminals, and the connector portion has connector-side connecting terminals for electrical connection with the holder-side connecting terminals; and

concurrently with mechanical connection of both the connecting portions, the holder-side connecting terminals and the connector-side connecting terminals are connected with each other, and thereby both the connecting portions are electrically connected with each other.

[Claim 6]

The motor according to any one of claims 1 to 5, characterized in that at least one of the brush holder and the

connector portion has a sealing member for sealing between the yoke housing and the gear housing.

[Claim 7]

5 The motor according to any one of claims 1 to 6, characterized in that the connector portion includes a control portion, which is integrally provided in the connector portion and controls rotation of the motor.

[Technical Field of Invention]

10 The present invention relates to a motor, in which a brush holder and a connector portion are integrally provided.

[Background Art]

15 An example of a motor in which a brush holder and a connector portion are integrally provided is disclosed in Patent Document 1. This motor is formed by integrally assembling the following elements: a motor body formed by housing an armature having a rotatable shaft and a commutator in a yoke housing; and a speed reducing portion formed by housing a speed reducing mechanism for decelerating the rotation of the rotatable shaft in a gear housing. A brush holder, which holds brushes that are brought into slidable
20 contact with the commutator and supply power, is clamped between the housings. The brush holder has a connector portion integrally molded for receiving power supply from an external source. The brush holder is formed by resin molding.

25 [Patent Document 1] Japanese Unexamined Patent Publication No. 2001-218420.

[Disclosure of Invention]

[Objective(s) of Invention]

The shape or direction of insertion of the connector portion or the like differs from purchaser to purchaser of motor. To cope with this, conventionally, a plurality of types of brush holders, different only in connector portion, are manufactured.

5 For this reason, forming dies for molding the entire brush holders including the connector portion must be fabricated with respect to each different constitution of connector portion. This is wasteful.

To cope with this, the following constitution is possible:

10 a connector portion and a brush holder are separated from each other, and a plurality of different types of connector portions are manufactured. Then, the connector portion and the brush holder in accordance with specifications from the purchaser of motor are electrically and mechanically connected together.

15 However, this poses a problem. To secure the insulation of the joint between a brush holder and a connector portion, the construction of the joint is complicated.

The present invention has been made with the above problem taken into account. An object of the present invention is to

20 provide a motor, in which a connector portion and a brush holder are separated from each other, and the construction of the joint between the connector portion and the brush holder is simplified and the insulation of the joint is secured without fail.

[Means for Achieving Objective(s)]

25 To achieve the objective of the present invention, according to the invention recited in claim 1, there is provided a motor comprising: a yoke housing that rotatably houses an

armature, wherein the armature has a rotatable shaft and a commutator; a gear housing that is integrally assembled to the yoke housing and houses a speed reducing mechanism for decelerating rotation of the rotatable shaft; a brush holder that
5 holds brushes in slidable contact with the commutator; and a connector portion for supplying the brushes with power from an external source, wherein: the brush holder has a holder-side connecting portion; the connector portion has a connector-side connecting portion for electrical and mechanical connection with
10 the holder-side connecting portion; and both the connecting portions are brought into connected state and clamped between the yoke housing and the gear housing.

According to the invention recited in claim 2, there is provided the motor of claim 1, wherein: the yoke housing and the
15 gear housing are assembled together in a direction of an axis of the rotatable shaft, and the holder-side connecting portion of the brush holder and the connector-side connecting portion of the connector portion are connected with each other in a direction, which coincides with a direction of assembly of both the housings.

20 According to the invention recited in claim 3, there is provided the motor of claim 1 or 2, wherein the connector portion has a restraining portion for restraining movement in a direction, which is orthogonal to the rotatable shaft.

25 According to the invention recited in claim 4, there is provided the motor of any one of claims 1 to 3, further including a plurality of fixing portions, which fix the yoke housing to the gear housing, wherein both the connecting portions are positioned

between at least two of the fixing portions.

According to the invention recited in claim 5, there is provided the motor according to any one of claims 1 to 4, wherein: the brush holder has holder-side connecting terminals, and the connector
5 portion has connector-side connecting terminals for electrical connection with the holder-side connecting terminals; and concurrently with mechanical connection of both the connecting portions, the holder-side connecting terminals and the connector-side connecting terminals are connected with each
10 other, and thereby both the connecting portions are electrically connected with each other.

According to the invention recited in claim 6, there is provided the motor of any one of claims 1 to 5, wherein at least one of the brush holder and the connector portion has a sealing
15 member for sealing between the yoke housing and the gear housing.

According to the invention recited in claim 7, there is provided the motor of any one of claims 1 to 6, wherein the connector portion includes a control portion, which is integrally provided in the connector portion and controls rotation of the
20 motor.

(Operation)

According to the invention recited in claim 1, the holder-side connecting portion provided on the brush holder and the connector-side connecting portion provided on the connector
25 portion are electrically and mechanically brought into connected state. When the yoke housing and the gear housing are assembled together, the connecting portions are clamped between both the

5 housings. That is, since the connector portion is separated from the brush holder, the following advantage is brought: even if connector portions are different in constitution (different in shape or direction of insertion or the like), a plurality of different types of connector portions only have to be manufactured in accordance with the differences in constitution. The commonality of brush holders can be provided. For this reason, while a plurality of different types of forming dies are fabricated for molding connector portions, only one type of forming die has to be fabricated for brush holders. As a result, waste can be cut.

10 According to the invention recited in claim 2, the holder-side connecting portion of the brush holder and the connector-side connecting portion of the connector portion are connected with each other in a direction, which coincides with a direction of assembly of both the housings (axial direction of the rotatable shaft). In this way, the assembling direction of the motor components is made uniform to improve the assembling of the motor.

20 According to the invention recited in claim 3, the connector portion has a restraining portion for restraining movement in a direction, which is orthogonal to the rotatable shaft. In this way, movement of the connector portion is limited, so that the connected state between the connecting portion and the connecting portion of the brush holder can be reliably maintained.

25 According to the invention recited in claim 4, the

connecting portions, which connects between the brush holder and the connector portion, are provided between at least two of the fixing portions, which fix the yoke housing to the gear housing. In this way, the clamping of the connecting portions by the housings is more reliable, so that the connected state of the connecting portions is more reliably maintained.

According to the invention recited in claim 5, concurrently with mechanical connection of both the connecting portions of the brush holder and of the connector portion, the holder-side connecting terminals and the connector-side connecting terminals are connected with each other, and thereby both the connecting portions are electrically connected with each other. In this way, the electrical connection and the mechanical connection can be made at once, so that the connecting operation can be made simple.

According to the invention recited in claim 6, at least one of the brush holder and the connector portion has a sealing member for sealing between the yoke housing and the gear housing. In this way, the reliable sealing between the housings can be made to more reliably establish the electrical insulation between the connecting portion of the brush holder and the connecting portion of the connector portion. Furthermore, the sealing between the housings can be made by assembling the housings through clamping of the predetermined parts of the brush holder and of the connector portion. Thus, at the time of assembling of the housings, it is not required to separately assemble the seal member.

According to the invention recited in claim 7, the

connector portion includes a control portion, which is integrally provided in the connector portion and controls rotation of the motor. In this way, the connector portion, which includes the control portion, can achieve the above advantages.

5 [Embodiment of Invention]

Hereafter, description will be given to an embodiment in which the present invention is realized with reference to drawings.

10 FIG. 1 illustrates a motor 1 in this embodiment. The motor 1 in this embodiment is used as a driving source for a power window device for vehicles. The motor 1 is formed by integrally assembling together a motor body 2 and a speed reducing portion 3 that decelerates the rotation of the motor body 2.

15 The motor body 2 has a yoke housing 4 in the shape of closed-end squashy cylinder. A plurality of magnets 5 are fixed to the inside surface of the yoke housing 4 in predetermined positions. An armature 6 is rotatably housed inside the magnets 5. More specific description will be given. The armature 6 has a rotatable shaft 7, and the basal portion of the rotatable shaft 20 7 is rotatably supported in a bearing 8 installed at the bottom of the yoke housing 4. A commutator 9 is fixed on the tip portion side of the rotatable shaft 7. The yoke housing 4 is assembled to the gear housing 21 of the speed reducing portion 3 in a direction of the axis L1 of the rotatable shaft 7. The yoke 25 housing 4 is secured by three screws 13 (only two are shown in FIG. 1) that constitute fixing portions.

A brush holder 10 is clamped between the opening 4a of the

yoke housing 4 and the opening 21a of the gear housing 21. When both the housings 4 and 21 are secured with the screws 13, the brush holder 10 is secured between the housings 4 and 21. As illustrated in FIG. 2 and FIG. 3, the brush holder 10 comprises a holder body 10a, a clamping portion 10b, and a holder-side connecting portion 10c.

The holder body 10a is fit into the opening 4a of the yoke housing 4 in the direction of the axis L1 of the rotatable shaft 7. A pair of brushes 11 that are in slidable contact with the commutator 9 are held by the holder body 10a at its brush holding portion 10d. A bearing 12 is held in the center of the holder body 10a. The bearing 12 rotatably supports the tip portion side of the rotatable shaft 7.

The clamping portion 10b is extended from the holder body 10a like a flange, and is clamped between the openings 4a and 21a of the housings 4 and 21.

The holder-side connecting portion 10c is protruded from the holder body 10a outward in the radial direction, and is clamped together with the clamping portion 10b between the openings 4a and 21a of the housings 4 and 21. The holder-side connecting portion 10c is provided for electrical and mechanical connection with a connector portion 16 described later.

In the holder-side connecting portion 10c, a fitting bulge 10e and a coupling recess 10f are formed. The fitting bulge 10e that is protruded toward the speed reducing portion 3 in the direction of the axis L1 of the rotatable shaft 7. (The fitting bulge is protruded downward in FIG. 2.) The coupling recess 10f

is open toward the motor body 2 in the direction of the axis L1 of the rotatable shaft 7 at the fitting bulge 10e. (The coupling recess 10f is open upward in FIG. 2.) In the coupling recess 10f, the tip portions of holder-side terminals 14 as holder-side
5 connecting terminals are exposed. The tip portions of the holder-side terminals 14 are in male configuration. The holder-side terminals 14 are insert molded on the holder-side connecting portion 10c and the holder body 10a, and are electrically connected with the brushes 11 on the holder body 10a
10 side. In FIG. 1 and FIG. 2, the terminals 14 positioned in the holder body 10a are not omitted.

A sealing member 15 composed of such an elastic material as elastomer is integrally formed on the portions of the holder-side connecting portion 10c, excepting the area where the
15 terminals 14 are exposed, and the clamping portion 10b. The sealing member 15 is clamped between the openings 4a and 21a of the housings 4 and 21, and thereby seals the openings 4a and 21a.

The connector portion 16 comprises a connector body 16a and a connector-side connecting portion 16b that constitutes a
20 restraining portion. The connector body 16a is exposed to outside both the housings 4 and 21, and is coupled with a vehicle body-side connector (now shown) to supply power from the vehicle body side and for other purposes. The connector body 16a is so constructed that the vehicle body-side connector will be inserted thereinto
25 from the motor body 2 side in the direction of the axis L1 of the rotatable shaft 7. The connector body 16a has a recess 16c that is open toward the motor body 2 in the direction of the axis L1.

In the recess 16c, the tips of connector-side terminals 17 as connector-side connecting terminals are exposed. The connector-side terminals 17 are insert molded in the connector body 16 and the connector-side connecting portion 16b.

5 The connector-side connecting portion 16b is in such a shape that it is bent substantially at 90°C from the connector body 16a. The connector-side connecting portion 16b is clamped together with the holder-side connecting portion 10c and the clamping portion 10b between the openings 4a and 21a of the
10 housings 4 and 21. The tip portion of the connector-side connecting portion 16b is directed toward the direction opposite the direction of opening of the recess 16c. The tip portion is inserted into the coupling recess 10f provided in the holder-side connecting portion 10c in the direction of the axis L1 of the
15 rotatable shaft 7. As a result, the connector-side connecting portion 16b and the holder-side connecting portion 10c are coupled with each other. That is, the connector portion 16 is restrained from moving in the direction of the radius of the motor 1 (the direction orthogonal to the rotatable shaft 7) by this
20 coupling.

At the tip portion of the connector-side connecting portion 16, the basal portions of the connector-side terminals 17 are positioned. The basal portions of the connector-side terminals 17 are in female configuration. When the connector-side
25 connecting portion 16b and the coupling recess 10f of the holder-side connecting portion 10c are coupled (mechanically connected) with each other, the following simultaneously takes

place: the basal portions of the connector-side terminals 17 and the tip portions of the holder-side terminals 14 are connected (electrically connected) with each other.

5 A sealing member 18 similar with the sealing member 15 of the brush holder 10 is integrally molded on the connector-side connecting portion 16b. The sealing member 18 is clamped together with the sealing member 15 between the openings 4a and 21a of the housings 4 and 21, and thereby seals the openings 4a and 21a. The openings 4a and 21a of the housings 4 and 21 are sealed with these
10 sealing members 15 and 18, and the insulation of the joint between the terminals 14 and 17 can be secured without fail.

As mentioned above, electrically and mechanically connected with the brush holder 10, the connector portion 16 is placed between the openings 4a and 21a of the housings 4 and 21.
15 Both the housings 4 and 21 are secured with the three screws 13, and thereby the connector portion 16 and the brush holder 10 in connected state are secured between the housings 4 and 21. As illustrated in FIG. 3, the holder-side connecting portion 10c with which the connector portion 16 (connector-side connecting portion 16b) is coupled is positioned between two of the screws
20 13, which serve as the fixing portions. Thereby, electrical and mechanical connection can be maintained between the connector-side connecting portion 16b and the holder-side connecting portion 10c with reliability.

25 The speed reducing portion 3 includes the gear housing 21 of resin. In the opening 21a of the gear housing 21, a fitting recess 21b is formed for fitting the fitting bulge 10e of the brush

holder 10 thereinto in the direction of the axis L1 of the rotatable shaft 7. In the gear housing 21, a worm shaft 22 that is integrally provided with a worm 22a and constitutes the speed reducing mechanism is rotatably supported in a pair of bearings 23 installed in the housing 21. The worm shaft 22 is coupled with the rotatable shaft 7 of the motor body 2 through a clutch 24. The clutch 24 operates to transmit the torque of the rotatable shaft 7 to the worm shaft 22 and to prevent the torque from the worm shaft 22 from being transmitted to the rotatable shaft 7.

Further, in the gear housing 21, a worm wheel 25 is rotatably supported. The worm wheel 25 is engaged with the worm 22a of the worm shaft 22. An output shaft 26 is coupled with the center of the worm wheel 25 so that the output shaft will be rotated integrally with the worm wheel 25. When the motor body 2 is driven, the rotatable shaft 7 is rotated, and its rotation is transmitted to the worm shaft 22 through the clutch 24. The rotation of the worm shaft 22 is transmitted to the output shaft 26 through the worm wheel 25 to open or close window glass.

Next, description will be given below to the action and effect characteristic of the motor 1 of this embodiment constructed as mentioned above.

(1) The holder-side connecting portion 10c provided on the brush holder 10 and the connector-side connecting portion 16b provided on the connector portion 16 are electrically and mechanically brought into connected state. When the yoke housing 4 and the gear housing 21 are assembled together, the holder-side connecting portion 10c and the connector-side connecting portion

16b are clamped between the housings 4 and 21. That is, since the connector portion 16 is separated from the brush holder 10, the following advantage is brought: even if connector portions 16 are different in constitution (different in shape or direction of insertion or the like), a plurality of different types of connector portions 16 only have to be manufactured in accordance with the differences in constitution. The commonality of the brush holder 10 can be provided. For this reason, while a plurality of different types of forming dies are fabricated for molding connector portions 16, only one type of forming die has to be fabricated for brush holders 10. As a result, waste can be cut. As mentioned above, the connecting portions 10c and 16b for connection of the brush holder 10 and the connector portion 16 are clamped between the yoke housing 4 and the gear housing 21. Therefore, the connecting portions 10c and 16b are prevented from being externally exposed. As a result, the insulation of the connecting portions 10c and 16b can be secured without complicating the construction of the connecting portions 10c and 16b by applying a special seal or the like to the connecting portions 10c and 16b.

(2) The holder-side connecting portion 10c of the brush holder 10 and the connector-side connecting portion 16b of the connector portion 16 are connected together along the direction of assembly of the yoke housing 4 and the gear housing 21 (the direction of the axis L1 of the rotatable shaft 7). Thereby, the direction of assembly of the components of the motor 1 can be unified, and the assemblability of the motor 1 can be enhanced.

(3) The connector portion 16 is restrained from moving in the direction orthogonal to the rotatable shaft 7 by fitting the connector-side connecting portion 16b into the coupling recess 10f of the brush holder 10. Thereby, the movement of the connector portion 16 is restrained, and the connecting portions 10c and 16b that connect the brush holder 10 and the connector portion 16 can be kept in connected state without fail.

(4) The connecting portions 10c and 16b that connect the brush holder 10 and the connector portion 16 are so provided that the following takes place: the connecting portions 10c and 16b are positioned between the two screws 13 (fixing portions) of the three screws 13 for fixing the yoke housing 4 to the gear housing 21. Thereby, the connecting portions 10c and 16b are clamped between both the housings 4 and 21 with reliability; therefore, the connecting portions 10c and 16b can be kept in connected state without fail.

(5) Concurrently with mechanical connection of the connecting portions 10c and 16b of the brush holder 10 and the connector portion 16, the holder-side terminals 14 and the connector-side terminals 17 are connected together. Thereby, the connecting portions 10c and 16b are electrically connected together. Thus, the connecting portions 10c and 16b are electrically and mechanically connected at a time, and the connecting operation can be facilitated.

(6) The brush holder 10 and the connector portion 16 are provided at their predetermined portions with the sealing members 15 and 18 for sealing the area between the yoke housing 4 and the

gear housing 21. (The predetermined portions include the clamping portion 10b, holder-side connecting portion 10c, and connector-side connecting portion 16b.) Thereby, the area between the housings 4 and 21 can be sealed with reliability, and the connecting portions 10c and 16b, which connect the brush holder 10 and the connector portion 16, can be more positively insulated. The area between the housings 4 and 21 can be sealed only by assembling the housings 4 and 21 with predetermined portions of the brush holder 10 and the connector portion 16 clamped therebetween. (The predetermined portions include the clamping portion 10b, holder-side connecting portion 10c, and connector-side connecting portion 16b.) Therefore, when both the housings 4 and 21 are assembled together, the operation of separately assembling a sealing member is not required.

The embodiment of the present invention may be modified as follows:

The constitutions of the brush holder 10 and the connector portion 16 are not limited to the above-mentioned embodiment, and may be modified as appropriate. For example, the constitutions may be modified as illustrated in FIG. 4 to FIG. 7.

As shown in FIG. 4, the connector-side connecting portion 16d is formed on the connector portion 16. The connector-side connecting portion 16d has a fitting bulge 16e and a coupling recess 16f as restraining portions for fitting into the fitting recess 21b of the gear housing 21. Meanwhile, a holder-side connecting portion 10g is formed on the brush holder 10. The holder-side connecting portion 10g is fitted into the coupling

recess 16f in the direction of the axis L1 of the rotatable shaft
7 for electrical and mechanical connection with the
connector-side connecting portion 16d. That is, the construction
of the embodiment mentioned above may be inverted with respect
5 to the convex-concave relation. In this case, the connector
portion 16 is restrained from moving in the direction of the radius
of the motor 1 (the direction orthogonal to the rotatable shaft
7) by the following: the fitting bulge 16e is fitted into the
fitting recess 21b of the gear housing 21, and the coupling recess
10 16f is fitted onto the holder-side connecting portion 10g. This
constitution also brings about the same effect as the embodiment
mentioned above.

In an example illustrated in FIG. 5, the holder-side
connecting portion 10h of the brush holder 10 and the
15 connector-side connecting portion 16g of the connector portion
16 are electrically and mechanically connected. This connection
is carried out in the direction orthogonal to the direction of
the axis L1 of the rotatable shaft 7. Further, a fitting bulge
16h as a restraining portion, to be fitted into the fitting recess
20 21c of the gear housing 21, is formed on the connector-side
connecting portion 16g. This fitting bulge 16h is fitted into
the fitting recess 21c of the gear housing 21, and thereby the
connector portion 16 is restrained from moving in the direction
of the radius of the motor 1 (direction orthogonal to the
25 rotatable shaft 7). This constitution also brings about the same
effect as the embodiment mentioned above.

As in the embodiment mentioned above, a motor 1a of

amodification, illustrated in FIG. 6 and FIG. 7, has the following: the motor 1a has the holder-side connecting portion 10c in the brush holder 10 and the connector-side connecting portion 16b in the connector portion 16. The connector body 16a of the connector portion 16 is integrally provided with a control portion 19 that controls the rotation of the motor 1 (motor body 2). The control portion 19 has a control circuit board 20, and this control circuit board 20 is housed in the case of the connector body 16a. The control circuit board 20 is electrically connected with the connector-side terminals 17, and is provided with terminals 20a for external connection for connection with a vehicle body-side connector (not shown). If the connector portion 16 is integrally provided with the control portion 19 as mentioned above, the same effect as in the embodiment mentioned above can be obtained.

As mentioned above, the above embodiment is constructed in such a shape that the connector-side connecting portion 16b is engaged with the brush holder 10 in the direction orthogonal to the rotatable shaft 7. Thereby, the connector portion 16 is restrained from moving in this direction. However, the connector-side connecting portion 16b need not be engaged if not required.

In the embodiment mentioned above, the connecting portions 10c and 16b of the brush holder 10 and the connector portion 16 are so provided that they are positioned between the two screws 13, which serve as the fixing portions. However, the present invention is not limited to this constitution, and, for example,

only one screw 13 may be provided in proximity to the connecting portions 10c and 16b.

5 The embodiment mentioned above is so constructed that the connecting portions 10c and 16b of the brush holder 10 and the connector portion 16 are mechanically and electrically connected together at a time. However, mechanical connection and electrical connection need not be simultaneously provided.

10 The embodiment mentioned above is provided with the sealing member 15 and 18 for sealing the area between the yoke housing 4 and the gear housing 21. These sealing members are integrally formed on the predetermined portions of the brush holder 10 and the connector portion 16. (The predetermined portions include the clamping portion 10b, holder-side connecting portion 10c, and connector-side connecting portion 16b.) However, the sealing members 15 and 18 may be separated. The positions in which the sealing members 15 and 18 are provided are not limited to the foregoing, and may be changed as appropriate.

20 In the embodiment mentioned above, the clutch 24 is placed between the rotatable shaft 7 and the worm shaft 22. However, the clutch 24 may be omitted. In this case, the rotatable shaft 7 and the worm shaft 22 may be integrated with each other.

In the embodiment mentioned above, the commutator 9 is housed inside the yoke housing 4. However, the commutator 9 may be disposed on the rotatable shaft 7 outside the yoke housing 4.

25 The above description of the embodiment relates to a motor 1 that is used as a driving source for a power window device for vehicles. However, the present invention may be applied to motors

used in other devices in a vehicle or motors used in other devices than those for vehicles.

[Advantage of the Invention]

As described above, according to the invention, there is provided the motor, in which the connector portion and the brush holder are separated from each other, and the construction of the joint between the connector portion and the brush holder is simplified and the insulation of the joint is secured without fail.

[Brief Description of Drawings]

[FIG. 1]

FIG. 1 is a sectional view of a motor of an embodiment.

[FIG. 2]

FIG. 2 shows sectional views of the brush holder and the connector portion in the embodiment.

[FIG. 3]

FIG. 3 is a plan view illustrating the brush holder in the embodiment.

[FIG. 4]

FIG. 4 shows sectional views illustrating a brush holder and a connector portion in another example.

[FIG. 5]

FIG. 5 shows sectional views illustrating a brush holder and a connector portion in another example.

[FIG. 6]

FIG. 6 is a sectional view of a motor of another example.

[FIG. 7]

FIG. 7 shows sectional views illustrating the brush holder and the connector portion in the other example.

[Description of the reference numerals]

4: yoke housing, 6: armature, 7: rotatable shaft, 9: commutator,
5 10: brush holder, 10c, 10g, 10h: holder side connecting portion,
11: brush, 13: screw, which forms a fixing portion, 14: holder
side terminal serving as a holder side connecting terminal, 15:
sealing member, 16: connector portion, 16b: connector side
connecting portion, which forms a limiting portion, 16d, 16g:
10 connector side connecting portion, 16e, 16h: fitting bulge
serving as a limiting portion, 17: connector side terminal
serving as a connector side connecting terminal, 18: sealing
member, 19: control portion, 21: gear housing, 22: worm shaft,
which forms a speed reducing mechanism, 25: worm wheel, which
15 forms the speed reducing mechanism, L1: axial line

[Name of the Document] ABSTRACT

[Abstract]

[Objective]

5 It is an objective of the present invention to provide a motor, in which a connector portion and a brush holder are separated from each other, and the construction of the joint between the connector portion and the brush holder is simplified and the insulation of the joint is secured without fail.

[Solution]

10 A holder-side connecting portion 10c provided on a brush holder 10 and a connector-side connecting portion 16b provided on a connector portion 16 are electrically and mechanically connected with each other. The holder-side connecting portion 10c and the connector-side connecting portion 16b are clamped
15 between a yoke housing 4 and a gear housing 21 at time of assembly thereof.

[Selected Figure] FIG. 1

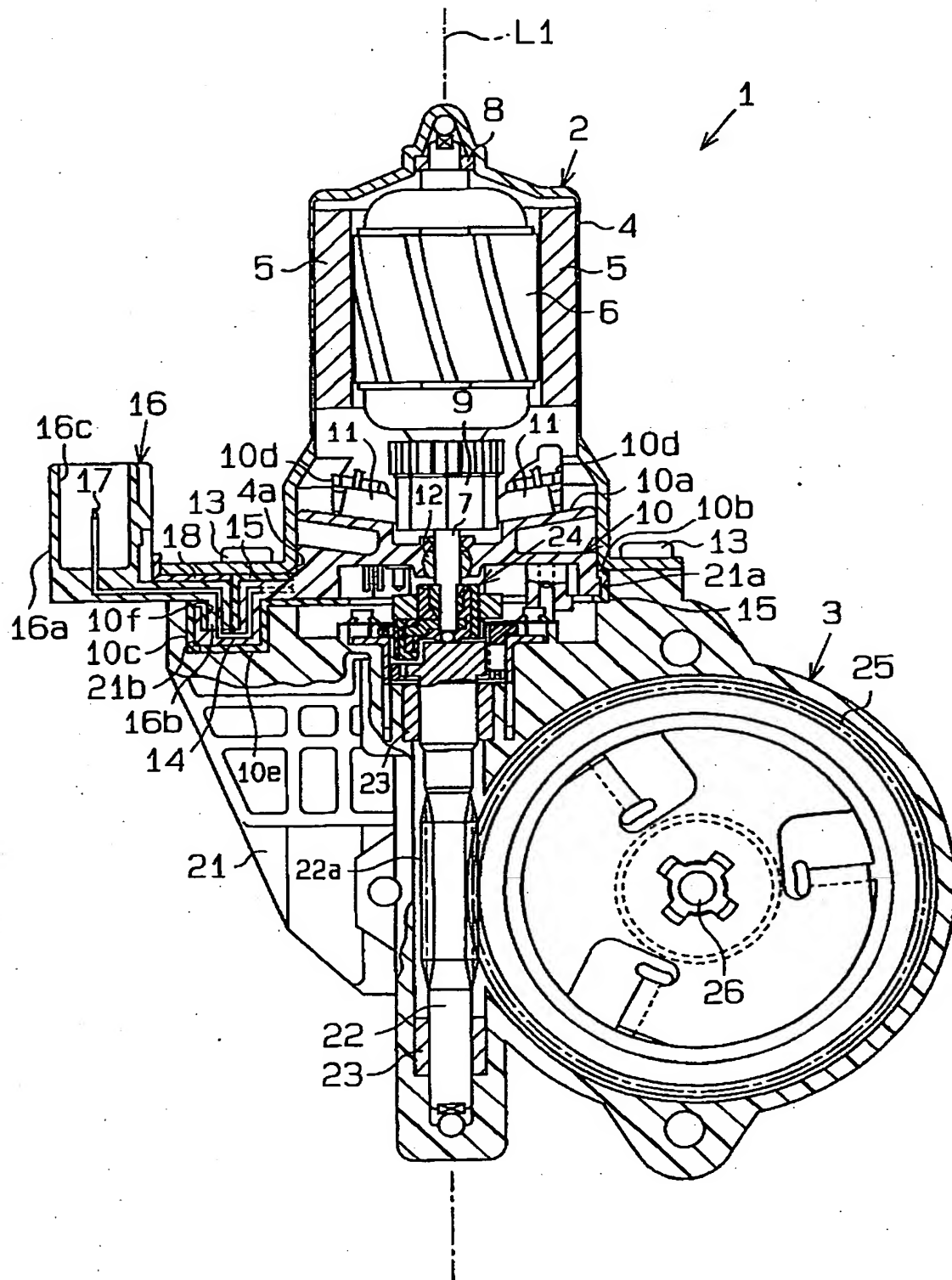
【書類名】

図面

[NAME OF DOCUMENT] DRAWINGS

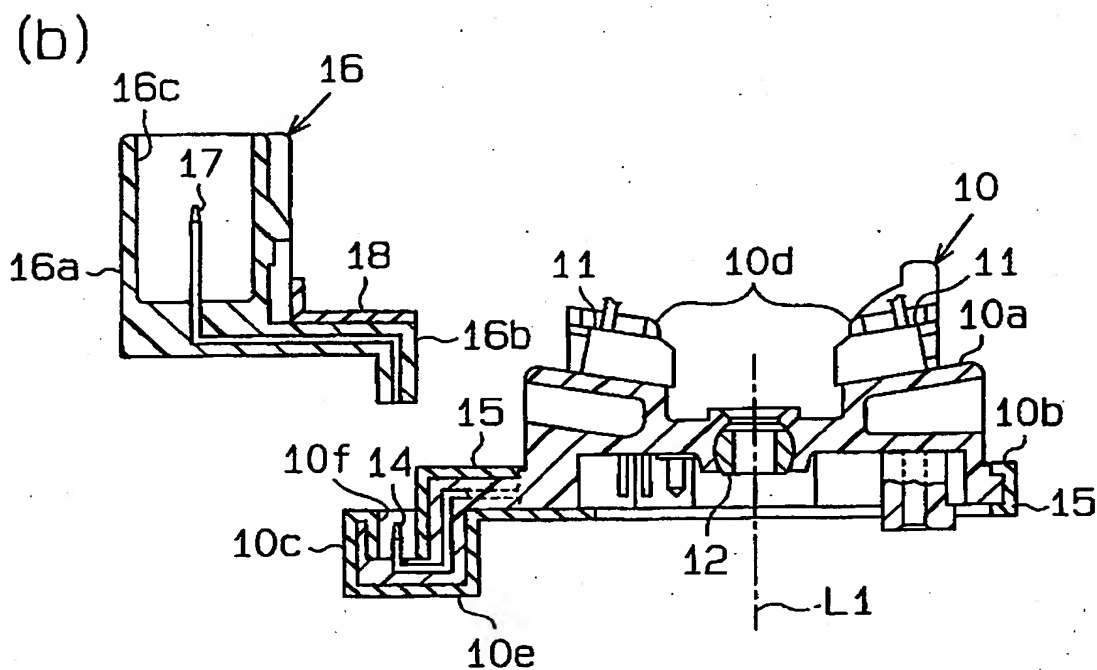
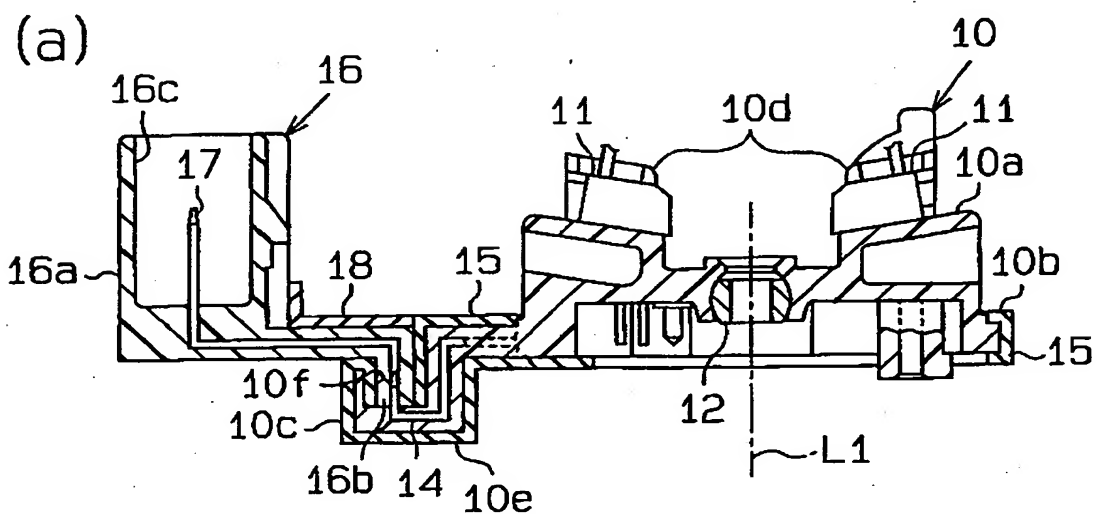
【図1】

[FIG. 1]



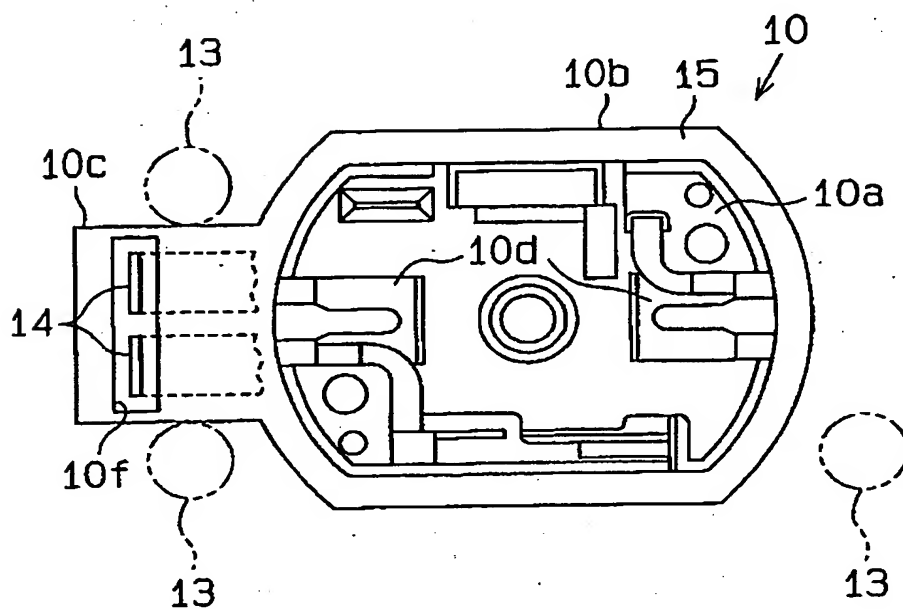
【図2】

[FIG. 2]



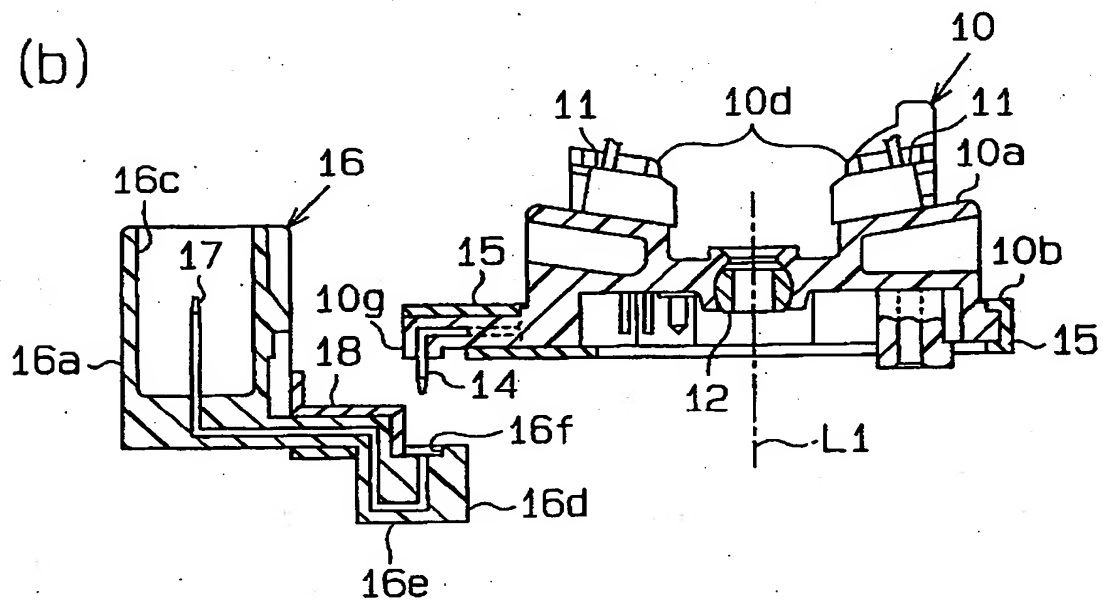
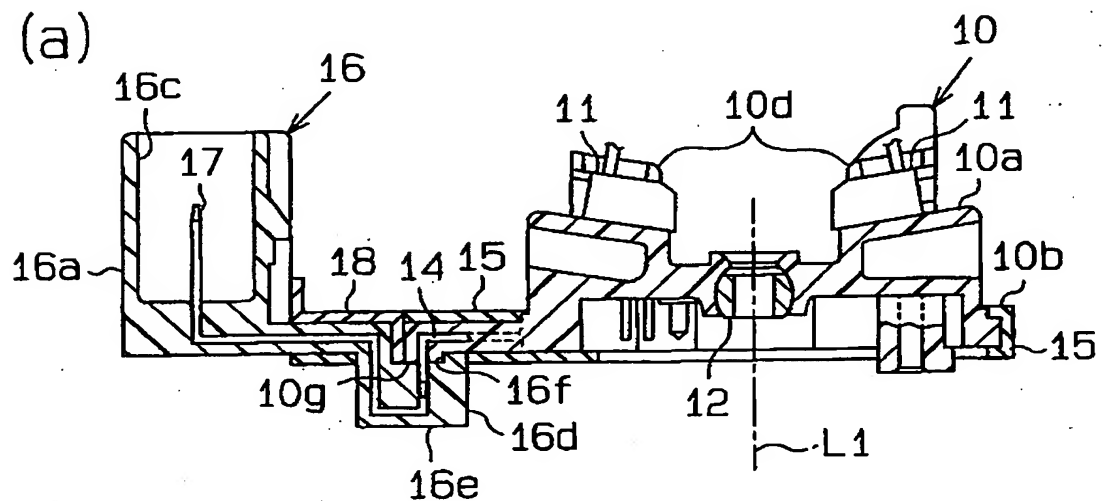
【図3】

[FIG. 3]



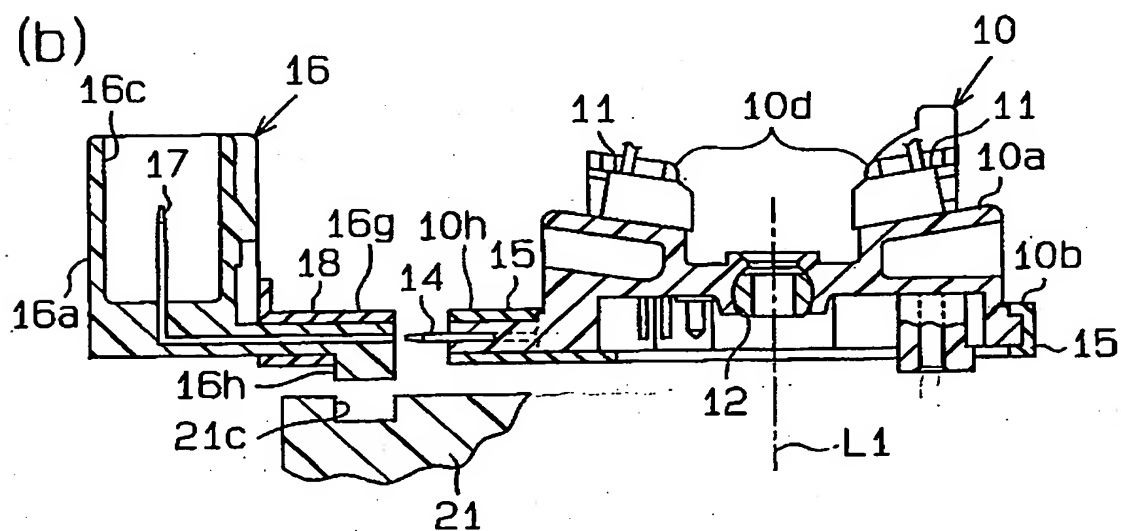
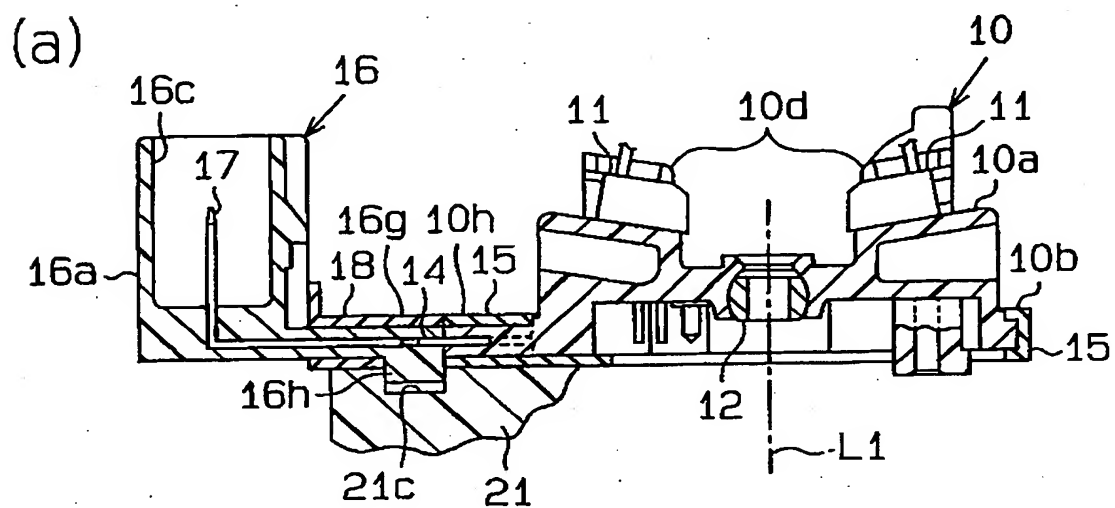
【図4】

[FIG. 4]



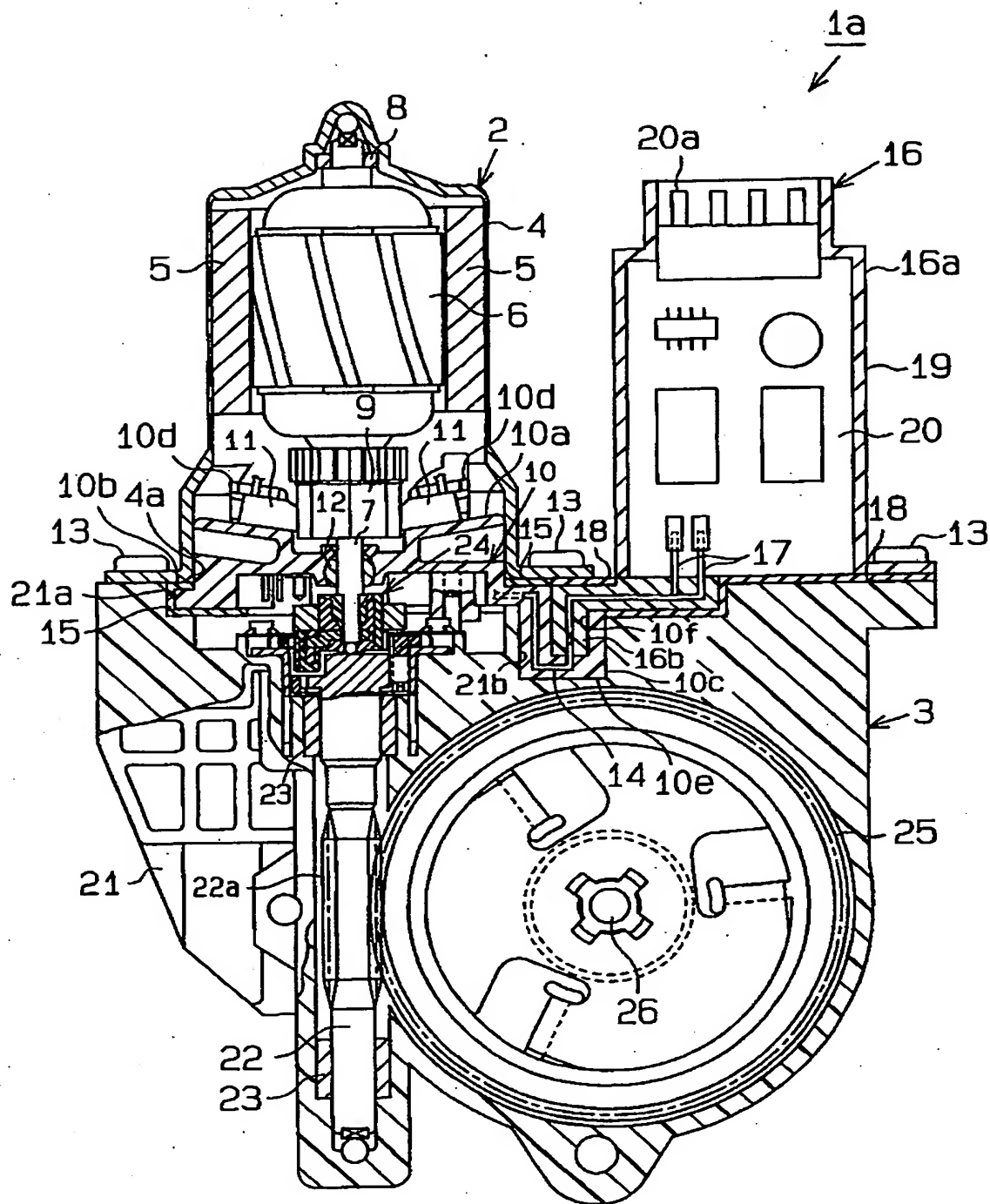
【図 5】

[FIG. 5]



【図6】

[FIG. 6]



【図7】

[FIG. 7]

